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PCT
WRITTEN OPINION
(PCT Rule 66)

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05 MAY -3

Date of mailing
(day/month/year) 27 APR 2005

Applicant's or agent's file reference
TING/20302314/KC/mt

REPLY DUE within **TWO MONTHS**
from the above date of mailing

International Application No.
PCT/SG2003/000223

International Filing Date (day/month/year)
19 September 2003

Priority Date (day/month/year)
19 September 2003

International Patent Classification (IPC) or both national classification and IPC

Int. Cl. ⁷ H01L 21/4763, 21/285, 23/36, 23/367, 23/373, 31/024, 31/052, 31/18, H01S 5/024

Applicant

TINGGI TECHNOLOGIES PRIVATE LIMITED et al

1. This written opinion is the **first** drawn by this International Preliminary Examining Authority.

2. This opinion contains indications relating to the following items:

- I ☒ Basis of the opinion
- II ☐ Priority
- III ☐ Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- IV ☐ Lack of unity of invention
- V ☒ Reasoned statement under Rule 66.2(a)(ii) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- VI ☐ Certain documents cited
- VII ☐ Certain defects in the international application
- VIII ☒ Certain observations on the international application

3. The **FINAL DATE** by which the international preliminary examination report must be established according to Rule 69.2 is:
19 January 2006

4. The applicant is hereby invited to reply to this opinion.

When? See the Reply Due date indicated above. However, the Australian Patent Office will not establish the Report before the earlier of (i) a response being filed, or (ii) one month before the Final Date by which the international preliminary examination report must be established. The Report will take into account any response (including amendments) filed before the Report is established. If no response is filed by 1 month before the Final Date, the international preliminary examination report will be established on the basis of this opinion.

Applicants wishing to have the benefit of a further opinion (if needed) before the report is established should ensure that a response is filed at least 3 months before the Final Date by which the international preliminary examination report must be established.

How? By submitting a written reply, accompanied, where appropriate, by amendments, according to Rule 66.3. For the form and the language of the amendments, see Rules 66.8 and 66.9.

Also For an additional opportunity to submit amendments, see Rule 66.4.
For the examiner's obligation to consider amendments and/or arguments, see Rule 66.4bis.
For an informal communication with the examiner, see Rule 66.6.

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SEARCHED	SERIALIZED	INDEXED	FILED
27-6-05			
FINDER			

I. Basis of the opinion

1. With regard to the elements of the international application:*

- ☒ the international application as originally filed.
- ☐ the description, pages , as originally filed,
pages , filed with the demand,
pages , received on with the letter of
- ☐ the claims, pages , as originally filed,
pages , as amended under Article 19,
pages , filed with the demand,
pages , received on with the letter of
- ☐ the drawings, pages , as originally filed,
pages , filed with the demand,
pages , received on with the letter of
- ☐ the sequence listing part of the description:
pages , as originally filed
pages , filed with the demand
pages , received on with the letter of

2. With regard to the language, all the elements marked above were available or furnished to this Authority in the language in which the international application was filed, unless otherwise indicated under this item.

These elements were available or furnished to this Authority in the following language which is:

- ☐ the language of a translation furnished for the purposes of international search (under Rule 23.1(b)).
- ☐ the language of publication of the international application (under Rule 48.3(b)).
- ☐ the language of the translation furnished for the purposes of international preliminary examination (under Rules 55.2 and/or 55.3).

3. With regard to any nucleotide and/or amino acid sequence disclosed in the international application, the written opinion was drawn on the basis of the sequence listing:

- ☐ contained in the international application in printed form.
- ☐ filed together with the international application in computer readable form.
- ☐ furnished subsequently to this Authority in written form.
- ☐ furnished subsequently to this Authority in computer readable form.
- ☐ The statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.
- ☐ The statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished.

4. ☐ The amendments have resulted in the cancellation of:

- ☐ the description, pages
- ☐ the claims, Nos.
- ☐ the drawings, sheets/fig.

5. ☐ This opinion has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed, as indicated in the Supplemental Box (Rule 70.2(c)).

** Replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this opinion as "originally filed"*

V. Reasoned statement under Rule 66.2(a)(ii) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Claims 1-53	YES
	Claims	NO
Inventive step (IS)	Claims	YES
	Claims 1-53	NO
Industrial applicability (IA)	Claims 1-53	YES
	Claims	NO

2. Citations and explanations

US 6562648 B1 (WONG et al.) 13 May 2003—Column 4, lines 3-17; figures 1a-1g
 US 2003/0064535 A1 (KUB et al.) 3 April 2003—Page 2, paragraphs [0032]–[0035]; figures 1(a)–1(d)
 US 6448102 B1 (KNEISSL et al.) 10 September 2002—Column 2, lines 5-38; figures 11a-11f
 US 6210479 B1 (BOJARCZUK et al.) 3 April 2001—Column 3, line 18—column 4, line 52; figures 1-6
 EP 1326290 A2 (XEROX CORPORATION) 9 July 2003—Abstract; figure 2

INVENTIVE STEP (IS) CLAIMS 1-53

While the cited documents do not specifically disclose electroplating of a thick copper layer, they do disclose bonding of a thick metal layer on the side other than the sapphire substrate, and the subsequent removal of the sapphire substrate. KUB states that "Any number of bonding techniques may be used". KNEISSL states that "The laser diode array may be attached to a thermally conductive wafer before or after substrate removal by soldering, thermo-compression bonding or other means". Electroplating would be an obvious method to a person skilled in the art. Consequently the claims do not involve an inventive step.

VIII. Certain observations on the international application

The following observations on the clarity of the claims, description, and drawings or on the question whether the claims are fully supported by the description, are made:

1. The claims as a whole are not clear and do not relate to a single invention. Independent claims 1, 29, 38, 43, 48 and 50 are each characterised by their own set of technical features. It is therefore not clear which technical features define the scope of the monopoly sought. Each independent claim appears to include technical features that are missing from another independent claim. It is therefore not clear whether such features are essential to defining the invention.
2. The claims are not fully supported by the description. Each independent claim lacks one or more technical features that appear to be essential to defining the invention.
3. The description relates to sapphire substrates and electroplating of thick copper layer. These essential features do not appear in the independent claims.